CLAIMS

1. A water-resistant telecommunication cable comprising a longitudinal cavity extending along the length of the cable and a solid and compact element housing at least one transmitting element, wherein the solid and compact element is associated with the cavity and comprises a water-soluble polymer material comprising:

- a vinyl alcohol/vinyl acetate copolymer having a hydrolysis degree of about 60% to about 95% and a polymerisation degree higher than about 1,800;

-at least a first solid plasticizer, having a melting point between 50° and 110°C, and a second solid plasticizer, having a melting point equal or higher than 140°C, in an amount of about 10-30 and 1-10 parts by weight per hundred parts by weight of the copolymer, respectively;

the water-soluble polymer material showing:

-a complex modulus (G*) equal or higher than 2.5 10^6 MPa;

-a ratio of the viscous modulus to the elastic modulus (tanδ) equal or lower than 2.30;

-a glass transition temperature (Tg) of about 20° to about 35°C.

2. Cable according to claim 1, wherein the solid and compact element comprises about 30% by weight or more of the water-soluble polymer material.

3. Cable according to claim 1 or 2, wherein the solid and compact element comprises about 50% by weight or more of the water-soluble polymer material.

4. Cable according to any of the previous claims, wherein the solid and compact element comprises about 75% by weight or more of the water-soluble polymer material.

5. Cable according to any of the previous claims, wherein the solid and compact element is a structural element of the cable.

6. Cable according to the previous claim, wherein the structural element is a tubular element comprising at least one

sheath made of the water-soluble polymer material, and wherein the cavity is defined by the inner volume of the tubular element.

7. Cable according to the previous claim, wherein the tubular element is a single sheath completely made of the water-soluble polymer material.

8. Cable according to any of claims 1 to 6, wherein the tubular element is a double layer sheath, the inner layer being made of the water-soluble polymer material and the outer layer being made of a water-insoluble polymer material.

9. Cable according to of claims 1 to 6, wherein the tubular element is a three-layer sheath, the inner and the outer layers being made of the water-soluble polymer material and the intermediate layer being made of a water-insoluble polymer material.

10. Cable according to any of the previous claims, wherein the solid and compact element is a buffer tube and the transmitting element is an optical fibre.

11. Cable according to any of the previous claims, wherein the copolymer is in an amount of from about 50% to about 95% of the total weight of the water-soluble polymer material.

12. Cable according to any of the previous claims, wherein the copolymer is in an amount of from about 60% to about 85% of the total weight of the water-soluble polymer material.

13. Cable according to any of the previous claims, wherein the copolymer has a hydrolysis degree of from about 70% to about 92% and a polymerisation degree of about 2,500 to 3,700.

14. Cable according to any of the previous claims, wherein the copolymer has a polymerisation degree of about 3,000 to 3,500.

15. Cable according to any of the previous claims, wherein the first and the second plasticizers are in an amount of about 12-25 and 3-7 parts by weight per hundred parts by weight of the copolymer, respectively.

16. Cable according to any of the previous claims, wherein the first and second plasticizers are polyhydric alcohols.

17. Cable according to any of the previous claims, wherein the first plasticizer is selected from sorbitol, trimethylolpropane, di-trimethylolpropane, methylpropyl propanediol, and mixtures thereof, and the second plasticizer is selected from mannitol, pentaerythritol, dipentaerythritol, trimethylolethane, and mixtures thereof.

18. Cable according to any of the previous claims, wherein the first plasticizer is trimethylolpropane or di-trimethylolpropane and the second is pentaerythritol or dipentaerythritol.

19. Cable according to any of the previous claims, wherein the first and the second plasticizer are in an amount of about 20 and about 5 parts by weight per hundred parts by weight of said copolymer, respectively.

20. Cable according to any of the previous claims, wherein the water-soluble polymer material comprises a third plasticizer, liquid at room temperature, in an amount of about 0.5-10 parts by weight per hundred parts by weight of the copolymer.

21. Cable according to the previous claim, wherein the third plasticizer is a polyhydric alcohol.

22. Cable according to claim 20 or 21, wherein the third plasticizer is selected from glycerol, ethylene glycol, diethylene glycol, triethylene glycol, propylene glycol, dipropylene glycol, tripropylene glycol, trimethylolpropane ethoxylates, pentaerythritol ethoxylates, and mixtures thereof.

23. Cable according to any of claims 20 to 22, wherein the third plasticizer is in an amount of 2-7 parts by weight per hundred parts by weight of said copolymer.

24. Cable according to any of claims 20 to 23, wherein the third plasticizer is in amount of 5 parts by weight per hundred parts by weight of said copolymer.

25. Cable according to any of claims 20 to 23, wherein the third plasticizer is diethylene glycol or triethylene glycol.

26. Cable according to any of the previous claims, wherein G* is between $3.0\ 10^6$ and $4.0\ 10^6$ MPa.

27. Cable according to any of the previous claims, wherein tanδ is between 0.5 and 2.0.

28. Cable according to any of the previous claims, wherein Tg is between 25° and 30°C.

29. Cable according to any of the previous claims, wherein the water-soluble polymer material comprises a hydrolysis stabilizer compound comprising a chelant group comprising two hydrogen atoms bonded to two respective heteroatoms selected from nitrogen, oxygen and sulfur, said two hydrogen atoms having a distance between each other of from 4.2×10^{-10} m to 5.8×10^{-10} m, , said stabilizer compound being present in an amount of at least 0.75 mmoles per 100 g of the copolymer.

30. Cable according to the previous claim, wherein the stabiliser is N,N'-esan-1,6-diylbis[3,5-di-ter-butyl-4-hydroxyphenyl)propionamide].

31. Method for maintaining loose a transmitting element of a water-resistant telecommunication cable, upon the extrusion thereof, comprising a longitudinal cavity extending along the length of the cable and a solid and compact element housing the transmitting element which comprises preparing the solid and compact element using a water-soluble polymer material comprising:

- a vinyl alcohol/vinyl acetate copolymer having a hydrolysis degree of about 60% to about 95% and a polymerisation degree higher than about 1,800;

-at least a first solid plasticizer, having a melting point between 50° and 110°C, and a second solid plasticizer, having a melting point equal or higher than 140°C, in an amount of about 10-30 and 1-10 parts by weight per hundred parts by weight of the copolymer, respectively;

the water-soluble polymer material showing:

-a complex modulus (G*) equal or higher than $2.5\ 10^{6}$ MPa;

-a ratio of the viscous modulus to the elastic modulus (tanδ) equal or lower than 2.30;

-a glass transition temperature (Tg) of about 20° to about 35°C.

32. Use of a water-soluble polymer material comprising:

- a vinyl alcohol/vinyl acetate copolymer having a hydrolysis degree of about 60% to about 95% and a polymerisation degree higher than about 1,800;

-at least a first solid plasticizer, having a melting point between 50° and 110°C, and a second solid plasticizer, having a melting point equal or higher than 140°C, in an amount of about 10-30 and 1-10 parts by weight per hundred parts by weight of the copolymer, respectively;

the water-soluble polymer material showing:

-a complex modulus (G*) equal or higher than 2.5 10^6 MPa;

-a ratio of the viscous modulus to the elastic modulus (tanδ) equal or lower than 2.30;

-a glass transition temperature (Tg) of about 20° to about 35°C;

for the preparation of a solid and compact element of a water-resistant telecommunication cable comprising a longitudinal cavity extending along the length of the cable and the solid and compact element housing a transmitting element for maintaining loose the latter upon extrusion of the cable.